What is claimed is:

1. A video encoding/decoding method based on interlaced frame motion estimation and/or compensation, the method comprising:

(a) receiving a macroblock as a received macroblock and a search range and estimating a frame motion vector for each integer pixel;

(b) matching bottom field pixels in the received macroblock with top field pixels in a reference frame that correspond to locations indicated by a scaled frame motion vector whose vertical component has been scaled according to field-to-field distances, and matching top field pixels in the received macroblock with bottom field pixels in the reference frame that correspond to the frame motion vector, if the vertical component of the frame motion vector estimated in step (a) is an odd value; and

(c) matching the top or bottom field pixels in the received macroblock with the top or bottom field pixels in the reference frame that correspond to the frame motion vector, if the vertical component of the frame motion vector estimated in step (a) is an even value.

2. The video encoding/decoding method of claim 1, wherein in step (b), the bottom field pixels in the macroblock are matched with top field pixels in the reference frame that are adjacent to the locations indicated by the scaled frame motion vector, and motions between the bottom field pixels and the top field pixels are estimated and/or compensated for based on the frame motion vector for each integer pixel.

3. The video encoding/decoding method of claim 1, wherein in step (b), the bottom field pixels in the macroblock are matched with bottom field pixels in the reference frame that are adjacent to the locations indicated by the scaled frame motion vector, and motions between the bottom field pixels and the top field pixels are estimated and/or compensated for based on the frame motion vector for each integer pixel.

4. The video encoding/decoding method of claim 1, wherein in step (b), when each of the top field pixels at the locations indicated by the scaled frame motion vector is P_x, P_u is a top field pixel right over the pixel P_x, P_d is a top field pixel right under the pixel P_x, and d_u and d_d are distances between P_x and P_u and between P_x and P_d, respectively, if d_u is smaller than or equal to d_d, P_x is replaced by P_u, and if d_u is greater than d_d, P_x is replaced by P_d.

5. The video encoding/decoding method of claim 1, wherein in step (b), when each of the top field pixels at the locations indicated by the scaled frame motion vector is P_x, P_u is a top field pixel right over the pixel P_x, P_d is a top field pixel right under the pixel P_x, and d_u and d_d are distances between P_x and P_u and between P_x and P_d, respectively, if du is smaller than d_d, P_x is replaced by P_u, and if d_u is greater than or equal to d_d, P_x is replaced by P_d.

6. The video encoding/decoding method of claim 1, wherein if the vertical component of the frame motion vector is an odd value, it is scaled by d_{b2t}/d_{t2b}, wherein d_{b2t} denotes a distance between a bottom field of the n-th frame $F^b(n)$ and a top field of the (n+1)th frame $F^t(n+1)$ and d_{t2b} denotes a distance between a top field of the n-th frame $F^t(n)$ and a bottom field of the (n+1)th frame $F^b(n+1)$.

7. A method of encoding/decoding an interlaced video, the method comprising:

(a) setting a macroblock as a set macroblock and a search range for image data;

(b) determining whether a vertical component of a motion vector for each of integer pixels in the set macroblock is an even or odd value, and matching top and bottom field pixels in the set macroblock with field pixels in a reference frame that correspond to locations indicated by one of the motion vector and a scaled motion vector that is estimated depending on the locations of pixels; and

(c) if the motion vector for each of the integer pixels of the macroblock has been completely estimated in step (b), matching the top/bottom field pixels in the set macroblock with half pixels in the reference frame that correspond to the motion vector, wherein the matching is performed according to the vertical component of the motion vector.

8. The method of claim 7, wherein step (b) comprises:

matching the top or bottom field pixels in the macroblock with the top or bottom field pixels in the reference frame that correspond to the motion vector, if the vertical component of the motion vector for each of the integer pixels in the set macroblock is an even value; and

matching the bottom field pixels in the macroblock with the top field pixels in the reference frame that correspond to an extended motion vector of the motion vector that is extended depending on distances between fields to be matched, if the vertical component of the motion vector for each of the integer pixels in the set macroblock is an odd value.

9. The method of claim 7, wherein step (a) comprises:

performing general halfpel motion estimation/compensation if the vertical component of the motion vector for each of the integer pixels is an even value; and

performing halfpel motion estimation/compensation with bilinear interpolation with respect to the top field pixels and performing halfpel motion estimation/compensation with respect to the bottom field pixels using an extended motion vector of the motion vectors that is extended depending on distances between fields to be matched, if the vertical component of the motion vector for each of the integer pixels is an odd value.

10. The method of claim 7, further comprising producing information that represents whether the vertical component of the motion

vector for each of the integer pixels estimated in step (c) is an odd or an even value.

11. An apparatus for encoding an interlaced video, the apparatus comprising:

a discrete cosine transform unit performing a discrete cosine transform operation on individual macroblocks of incoming image data and outputting discrete cosine transformed image data;

a quantization unit quantizing the discrete cosine transformed image data and outputting a quantized image data;

a dequantization unit dequantizing the quantized image data and outputting dequantized image data;

an inverse discrete cosine transform unit performing inverse discrete cosine transform operation on the dequantized image data and outputting inverse discrete cosine transformed image data;

a frame memory storing the inverse discrete cosine transformed image data on a frame-by-frame basis; and

a motion estimation/motion compensation unit determining whether a vertical component of a motion vector for each integer pixel in a macroblock is an even or an odd value when the incoming image data of a current frame is compared with image data of a previous frame stored in the frame memory, and if the vertical component of the motion vector is an odd value, matching bottom field pixels with top or bottom field pixels in the previous frame that

correspond to a scaled motion vector of the motion vector that is scaled depending on distances between fields to be matched.

12. An apparatus for decoding an interlaced video, the apparatus comprising:

a dequantization unit dequantizing variable length coded image data and outputting dequantized image data;

an inverse discrete cosine transform unit performing inverse discrete cosine transform operation on the dequantized image data and outputting inverse discrete cosine transformed image data;

a frame memory storing the inverse discrete cosine transformed image data on a frame-by-frame basis; and

a motion estimation/motion compensation unit determining whether a vertical component of a motion vector for each integer pixel in a macroblock is an even or odd value when incoming image data of a current frame is compared with image data of a previous frame stored in the frame memory, and if the vertical component of the motion vector is an odd value, matching bottom field pixels with top or bottom field pixels in the previous frame that correspond to a scaled motion vector of the motion vector that is scaled depending on distances between fields to be matched.